

REMARKS

Initially, Applicants would like to express appreciation to the Examiner for the detailed Official Action provided, and for the acknowledgment of Applicants' Information Disclosure Statement by return of the Form PTO-1449.

Claims 1-31 are currently pending. Claims 2-4, 14, 23, 24, and 26 stand withdrawn from consideration by the Examiner as being drawn to a nonelected invention. Applicants respectfully request reconsideration of the outstanding rejection and allowance of claims 1, 5-13, 15-22, 25, and 27-31 in the present application. Such action is respectfully requested and is now believed to be appropriate and proper.

Claims 1, 11-13, 15-22, 29, 30, and 31 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over LI (U.S. Pub. No. 2004/0108581) in view of ISAAK et al. (U.S. Pub. No. 2001/0035572).

However, Applicants note that LI and ISAAK et al. fail to teach or suggest the subject matter claimed in claim 1. In particular, claim 1 sets forth a semiconductor package including, inter alia, a first substrate having a first adhesive layer, a window opening, and a plurality of conductive traces; a first semiconductor die having an electrically active side mounted to the first substrate through the first adhesive layer; a second adhesive layer having a first side attached to an electrically inactive side of the first semiconductor die; a second substrate having a plurality of conductive traces and a side with terminals; a third adhesive layer having a first side attached to the side of the second substrate with terminals; a last semiconductor die having an electrically inactive side mounted to a second side of the third adhesive layer and the electrically active side electrically coupled to the

conductive traces of the first or second substrate directly or through a redistribution device; an encapsulant; and signal transferring interconnections.

Figure 9 shows an embodiment of the present invention. In particular, the figure 9 embodiment of the semiconductor package includes a first substrate 1 having a die receiving area, a first adhesive layer, window opening, and a plurality of conductive traces; a first semiconductor chip 3 having the electrically active side mounted to the first substrate 1 through the first adhesive layer to electrically couple the first semiconductor die to the conductive traces; a second adhesive layer having a first side attached to the electrically inactive side of the first semiconductor chip 3; a second substrate 2 having a die receiving area, a plurality of conductive traces, and a side with terminals; a semiconductor flip-chip 8; a third adhesive layer; and a last semiconductor chip 4 having the electrically inactive side mounted to the second side of the third adhesive layer and the electrically active side electrically coupled to the conductive traces of the first or second substrate directly or through a redistribution device. As shown in figure 9, the semiconductor die 8 is flipped onto the second substrate 2, forming a flip-chip die. The last semiconductor die 4 is attached to the inactive side of the flip-chip die 8.

The LI patent publication discloses stacked semiconductor chips. The Examiner has taken the position that LI shows a semiconductor package including a first substrate 10, a first adhesive layer 35, a window opening 211, a first die 24, a second adhesive layer 37, a second substrate 40, a third adhesive layer 42, and a last die 45.

However, Applicants respectfully submit that LI fails to teach a semiconductor package including the adhesive layer as claimed. In this regard, Applicants note that the LI device includes a plurality of masses of bonding material 30, and a first dielectric material 35. See particularly figure

5; paragraph [0038] (“masses of bonding material 30” and “[a] first dielectric material 35 is desirably formed between the first face 26 and the first surface 12”). The LI adhesive comprises a plurality of discreet, separate masses; the LI adhesive does not comprise an adhesive layer. Thus, the masses of bonding material 30 and the dielectric material 35 do not constitute an adhesive layer, as claimed. Moreover, it is noted that the LI publication discloses (in another portion) a “first layer of adhesive 37” and a “second layer of adhesive 42” (paragraph [0039]). Thus, where the LI device includes a layer of adhesive, the LI publication refers to a layer of adhesive as such. Therefore, since the masses of bonding material 30 and the dielectric material 35 are not referred to in the LI publication as an adhesive layer, then the masses of bonding material 30 and the dielectric material 35 do not comprise an adhesive layer and cannot fairly be described as such. Thus, contrary to the Examiner’s position, LI does not include a first adhesive layer 35. Accordingly, the LI device does not include a semiconductor package including, inter alia, a first substrate having a first adhesive layer, as set forth in claim 1.

Further, the Examiner contends that it would have been obvious to substitute the window opening in the embodiment of figure 9 of LI for the substrate without a window opening in the embodiment of figures 1-8 to obtain predictable results. However, there is nothing in the cited prior art that would lead one of ordinary skill in the art to make this modification as suggested by the Examiner. In particular, the elements in combination do not merely perform the function that each element performs separately. In this regard, the LI publication teaches away from modifying the LI device of the embodiment of figures 1-8 to include the window opening of the embodiment of figure 9, since a window opening would not be effective in the embodiment of figures 1-8 of the LI device. Thus, the LI device also does not include a semiconductor package including, inter alia, a first

substrate having die receiving area, a first adhesive area, a window opening, and a plurality of conductive traces, as set forth in claim 1.

The ISAAK et al. patent publication is directed to a stackable chip package. However, ISAAK et al. fails to teach or suggest a first substrate having an adhesive layer and a window opening, as described above and as set forth in claim 1. Therefore, the ISAAK et al. fails to cure the deficiencies of the LI device, and even assuming, arguendo, that the teachings of LI and ISAAK et al. have been properly combined, Applicant's claimed semiconductor package would not have resulted from the combined teachings thereof.

Further, the Examiner contends that it would have been obvious to substitute the substrate having conductive traces and a side with terminals as taught by ISAAK et al. for the substrate of LI. However, there is nothing in the cited prior art that would lead one of ordinary skill in the art to make this modification. In particular, the elements in combination do not merely perform the function that each element performs separately. In other words, the substrate having conductive traces and a side with terminals do not merely perform the function that each element performs separately, but, rather, provide advantages and improvements over the prior art.

Therefore, there is nothing in the cited prior art that would lead one of ordinary skill in the art to make the modification suggested by the Examiner in the rejection of claim 1 under 35 U.S.C. § 103(a) over LI in view of ISAAK et al. Thus, the only reason to combine the teachings of LI and ISAAK et al. results from a review of Applicants' disclosure and the application of impermissible hindsight. Accordingly, the rejection of claim 1 under 35 U.S.C. § 103(a) over LI in view of ISAAK et al. is improper for all the above reasons and withdrawal thereof is respectfully requested.

Applicants submit that dependent claims 11-13, 15-22, 29, 30, and 31, which are at least patentable due to their dependency from claim 1 for the reasons noted above, recite additional features of the invention and are also separately patentable over the prior art of record based on the additionally recited features.

The Examiner has rejected claim 5 under 35 U.S.C. § 103(a) over LI in view of ISAAK et al., and further in view of TAO et al. (U.S. 6,118,176). The Examiner contends that it would have been obvious to include redistribution devices as taught by TAO et al. in the LI device and the results would have been predictable.

However, Applicants note that LI and ISAAK et al. fail to teach or suggest the subject matter claimed in independent claim 1, as described above. Further, TAO et al. fails to cure these deficiencies. Thus, even if the teachings of LI, ISAAK et al., and TAO et al. were combined, as suggested by the Examiner, the claimed combination would not result. Moreover, there is nothing in the cited prior art that would lead one of ordinary skill in the art to make the modification suggested by the Examiner in the rejection of claim 5 under 35 U.S.C. § 103(a) over LI in view of ISAAK et al. and further in view of TAO et al. In this regard, the bond pad being electrically relocated to the periphery of the last semiconductor device by a redistribution device does not merely perform the function that each element performs separately, but, rather, provides advantages and improvements over the prior art. Thus, the elements in combination do not merely perform the function that each element performs separately, and the only reason to combine the teachings of LI, ISAAK et al., and TAO et al. results from a review of Applicants' disclosure and the application of impermissible hindsight. Accordingly, the rejection of claim 5 under 35 U.S.C. § 103(a) over LI in view of ISAAK

et al. and further in view of TAO et al. is improper for all the above reasons and withdrawal thereof is respectfully requested.

The Examiner has rejected claim 6 under 35 U.S.C. § 103(a) over LI in view of ISAAK et al. and TAO et al., and further in view YANG et al. (U.S. 2004/0124539). The Examiner contends that it would have been obvious to include a wafer redistribution layer as taught by YANG et al. in the LI device and the results would have been predictable.

However, Applicants note that LI, ISAAK et al., and TAO et al. fail to teach or suggest the subject matter claimed in claim 5, as described above. Further, YANG et al. fails to cure these deficiencies. Thus, even if the teachings of LI, ISAAK et al., TAO et al., and YANG et al. were combined, as suggested by the Examiner, the claimed combination would not result. Moreover, there is nothing in the cited prior art that would lead one of ordinary skill in the art to make the modification suggested by the Examiner in the rejection of claim 6 under 35 U.S.C. § 103(a) over LI in view of ISAAK et al. and TAO et al., and further in view of YANG et al. In this regard, the redistribution device comprising a wafer redistribution layer does not merely perform the function that each element performs separately, but, rather, provides advantages and improvements over the prior art. Thus, the elements in combination do not merely perform the function that each element performs separately, and the only reason to combine the teachings of LI, ISAAK et al., TAO et al., and YANG et al. results from a review of Applicants' disclosure and the application of impermissible hindsight. Accordingly, the rejection of claim 6 under 35 U.S.C. § 103(a) over LI in view of ISAAK et al. and TAO et al., and further in view of YANG et al. is improper for all the above reasons and withdrawal thereof is respectfully requested.

The Examiner has rejected claims 7-10 under 35 U.S.C. § 103(a) over LI in view of ISAAK et al., and further in view TAO et al. or YANG et al., and further in view of FOSTER et al. (U.S. 6,603,072). The Examiner contends that it would have been obvious to include a metallic interposer as taught by FOSTER et al. in the LI device and the results would have been predictable.

However, Applicants note that LI, ISAAK et al., and TAO et al. or YANG et al. fail to teach or suggest the subject matter claimed in claim 5 or 6, as described above. Further, FOSTER et al. fails to cure these deficiencies. Thus, even if the teachings of LI, ISAAK et al., TAO et al., or YANG et al., and FOSTER et al. were combined, as suggested by the Examiner, the claimed combination would not result. Moreover, there is nothing in the cited prior art that would lead one of ordinary skill in the art to make the modification suggested by the Examiner in the rejection of claims 7-10 under 35 U.S.C. § 103(a) over LI in view of ISAAK et al. and TAO et al., or YANG et al., and further in view of FOSTER et al. In this regard, the redistribution device comprising a metallic interposer does not merely perform the function that each element performs separately, but, rather, provides advantages and improvements over the prior art. Thus, the elements in combination do not merely perform the function that each element performs separately, and the only reason to combine the teachings of LI, ISAAK et al., TAO et al., or YANG et al., and FOSTER et al. results from a review of Applicants' disclosure and the application of impermissible hindsight. Accordingly, the rejection of claims 7-10 under 35 U.S.C. § 103(a) over LI in view of ISAAK et al. and TAO et al. or YANG et al., and further in view of FOSTER et al. is improper for all the above reasons and withdrawal thereof is respectfully requested.

The Examiner has rejected claim 25 under 35 U.S.C. § 103(a) over LI in view of ISAAK et al., and further in view HER et al. (U.S. 2002/0180023). The Examiner contends that it would have

been obvious to include a spacer between dies as taught by HER et al. in the LI device and the results would have been predictable.

However, Applicants note that LI and ISAAK et al. fail to teach or suggest the subject matter claimed in independent claim 1, as described above. Further, HER et al. fails to cure these deficiencies. Thus, even if the teachings of LI, ISAAK et al., and HER et al. were combined, as suggested by the Examiner, the claimed combination would not result. Moreover, there is nothing in the cited prior art that would lead one of ordinary skill in the art to make the modification suggested by the Examiner in the rejection of claim 25 under 35 U.S.C. § 103(a) over LI in view of ISAAK et al. and further in view of HER et al. In this regard, the spacer in the stacking of the semiconductor dies does not merely perform the function that each element performs separately, but, rather, provides advantages and improvements over the prior art. Thus, the elements in combination do not merely perform the function that each element performs separately, and the only reason to combine the teachings of LI, ISAAK et al., and HER et al. results from a review of Applicants' disclosure and the application of impermissible hindsight. Accordingly, the rejection of claim 25 under 35 U.S.C. § 103(a) over LI in view of ISAAK et al. and further in view of HER et al. is improper for all the above reasons and withdrawal thereof is respectfully requested.

The Examiner has rejected claims 27 and 28 under 35 U.S.C. § 103(a) over LI in view of ISAAK et al., and further in view BOLKEN et al. (U.S. 2004/0178482). The Examiner contends that it would have been obvious to encapsulate the device as taught by BOLKEN et al. in the LI device to protect the device from the environment.

However, Applicants note that LI and ISAAK et al. fail to teach or suggest the subject matter claimed in independent claim 1, as described above. Further, BOLKEN et al. fails to cure these

deficiencies. Thus, even if the teachings of LI, ISAAK et al., and BOLKEN et al. were combined, as suggested by the Examiner, the claimed combination would not result. Moreover, there is nothing in the cited prior art that would lead one of ordinary skill in the art to make the modification suggested by the Examiner in the rejection of claims 27 and 28 under 35 U.S.C. § 103(a) over LI in view of ISAAK et al. and further in view of BOLKEN et al. In this regard, the encapsulant comprising a liquid encapsulant or a transfer molded molding compound does not merely perform the function that each element performs separately, but, rather, provides advantages and improvements over the prior art. Thus, the elements in combination do not merely perform the function that each element performs separately, and the only reason to combine the teachings of LI, ISAAK et al., and BOLKEN et al. results from a review of Applicants' disclosure and the application of impermissible hindsight. Accordingly, the rejection of claims 27 and 28 under 35 U.S.C. § 103(a) over LI in view of ISAAK et al. and further in view of BOLKEN et al. is improper for all the above reasons and withdrawal thereof is respectfully requested.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejections, and an early indication of the allowance of claims 1, 5-13, 15-22, 25, and 27-31.

SUMMARY AND CONCLUSION

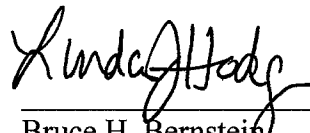
In view of the foregoing, it is submitted that the present response is proper and that none of the references of record, considered alone or in any proper combination thereof, anticipate or render obvious Applicants' invention as recited in claims 1, 5-13, 15-22, 25, and 27-31.

Accordingly, consideration of the present response, reconsideration of the outstanding Official Action, and allowance of all of the claims in the present application are respectfully requested and now believed to be appropriate.

Applicants have made a sincere effort to place the present application in condition for allowance and believe that they have now done so.

Should the Examiner have any questions, the Examiner is invited to contact the undersigned at the below-listed telephone number.

Respectfully submitted,
Chuen Khiang WANG et al.


Bruce H. Bernstein
Reg. No. 29,027

Linda J. Hodge
Reg. #47,343

February 2, 2010
GREENBLUM & BERNSTEIN, P.L.C.
1950 Roland Clarke Place
Reston, Virginia 20191
(703) 716-1191